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THE PERFORATION OF A VEIN BY AN ARTERY IN THE CAT (*FELIS DOMESTICA*).

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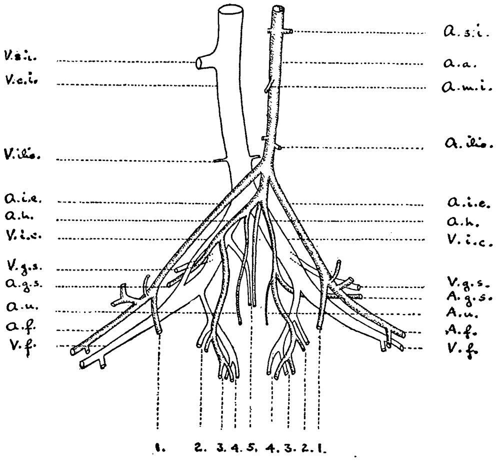
In a cat which was being dissected in my laboratory a few months ago, I noticed an artery passing through an opening in a vein, and as further dissection showed the details of this abnormality to be somewhat different from any similar condition which I have found recorded it seemed well to publish the following figure and description.

The cat was an adult female; the circulatory system had been injected with an ordinary starch injecting mass, the veins with blue and the arteries with red. For the sake of added clearness in the diagram the horns of the uterus were dissected free from the body-wall and together with the urinary bladder were laid back over the ventral side of the pubes; thus the umbilical arteries and the uterine arteries and veins are directed backward in the diagram instead of forward. It will be noticed that there is a longitudinal slit about a centimetre in length in the right



common iliac vein nearly opposite the point at which the superior gluteal branch of the internal iliac artery in given off, and through this slit the superior gluteal artery passes. This artery arises much farther cephalad than the left superior gluteal ; the latter is in the normal position. The corresponding veins, on the other hand, arise symmetrically from the dorsal surface of the two common iliac veins. The opening does not divide the vein into tubes of equal diameter, that on the median side being much broader than the tube on the outside, but the lumen is uninterrupted on both sides of the slit.

Abnormalities in the vessels in this region are very frequent in the cat, and this same specimen shows one or two others. Thus while the right umbilical artery leaves the internal iliac at the usual point the left comes off much farther caudad than is customary and is much smaller than the right. The median sacral vein arises from the right common iliac instead of the left, an abnormality which has frequently been observed. In other respects, however, the vessels in this region of the cat in question take the normal course.

Not a few cases are on record of veins which have been perforated by arteries. McClure ('00) mentions two instances in the cat where lumbar arteries are found passing through a foramen in the inferior vena cava, and the same writer ('00) records four cases in the opossum where the spermatic arteries pass through foramina in the same vessel, the inferior vena cava ; Hochstetter ('96) describes an Echidna embryo in which the inferior mesenteric artery passes through a foramen in the inferior vena cava. All of these abnormalities may be explained, however, if the inferior vena cava develops by a fusion of the posterior portions of the cardinal veins as appears probable ; McClure ('00) mentions a number of cases in which the posterior cardinals persist in the adult cat, and if the fusion were to take place after the formation of the lumbar arteries, they would be left perforating the vein.

More nearly approaching the condition which I have found, are the four cases recorded for the cat by McClure ('00) in which the internal iliac artery passes through a foramen in the common iliac vein very near the point at which it divides into the external and internal iliacs. This condition is not so readily explicable unless it should be shown that the internal iliac vein develops as a branch of the external, which again seems probable. If the internal iliac artery were first developed, the vein might well develop on both sides of it and thus become perforated.

A case which resembles mine still more closely is that figured by Treadwell ('96), — a perforation of the right common iliac vein by the right internal iliac artery; although this specimen was incomplete, the foramen appears to be much more cephalad than the point at which the internal iliac vein is given off, but here again it is the entire internal iliac artery which perforates the vein, instead of merely the superior gluteal branch as in my case.

Such abnormalities can only be explained by embryology, and very little appears to have been published on the development of the principal posterior branches of the dorsal aorta and the inferior vena cava. As to the way in which the perforation in question may have been brought about, the most reasonable explanation that has suggested itself to me is that the internal iliac artery grows out as a branch of the dorsal aorta before the common iliac vein develops from the inferior vena cava. If this should prove to be so, we can readily see that the anlage of the vein on coming in contact with the artery, or in this case its superior gluteal branch, might occasionally grow entirely around it instead of passing to one side. The fact that in the case figured the right superior gluteal artery arises from the internal iliac much farther forward than is usual and so comes to lie directly in the course of the right common iliac vein would seem to bear out this suggestion.

Blood vessels in the pelvic region of a cat, ventral aspect; the veins are in outline, the arteries shaded. The nomenclature adopted follows that used by Reigard and Jennings in their Anatomy of the Cat.

A. a. Aorta abdominalis.—*A. f.* A. femoralis. — *A. g. s.* A. glutea superior.— *A. h.* A. hypogastrica (iliaca interna).— *A. i. e.* A. iliaca externa.— *A. ilio.* A. iliolumbalis.— *A. m. i.* A. mesenterica inferior.— *A. s. i.* A. spermatica interna. — *A. u.* A. umbilicalis.— *V. c. i.* V. cava inferior.— *V. f.* V. femoralis.— *V. g. s.* V. glutea superior.— *V. i. c.* V. iliaca communis.— *V. ilio.* V. iliolumbalis.— *V. s. i.* V. spermatica interna.— 1. *A.* profunda femoris.— 2. *A.* and V. glutea inferior.— 3 *A.* and V. hemorrhoidalis media.— 4. *A.* and V. uterina.— 5. *A.* and V. sacralis media.

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